



Market Monitoring Unit

**REPORT
TO
THE FEDERAL ENERGY REGULATORY COMMISSION**

INTERFACE PRICING POLICY

PJM Market Monitoring Unit

August 12, 2002

On July 19, 2002, at approximately 1400, PJM notified market participants that pricing for transactions scheduled at the PJM-VAP interface but delivered at the PJM-AEP interface would be corrected effective at 1500.¹ In particular, PJM notified participants that if a transaction scheduled into PJM at the PJM-VAP interface includes an ECAR or MAIN control area, as determined by NERC Tag, then that transaction will be priced at the PJM-AEP interface price regardless of contract path, until further notice. PJM took this action based on a large and growing discrepancy between contract and actual power flows at the PJM-AEP interface and the PJM-VAP interface. (The pricing notices are attached.)

PJM took this action in accordance with 3.3.1(d) of Schedule 1 of the Operating Agreement, governing payment for deliveries to the PJM spot market, which states in part: “For pool External Resources the Office of the Interconnection shall model, based on an appropriate flow analysis, the hourly amounts delivered from each such resource to the corresponding interface point between adjacent Control Areas and the area comprised of the PJM West Region and PJM Control Area.”

PJM has five external interfaces, each defined with the adjacent external control area: PJM-NYIS; PJM-FE; PJM-DLCO; PJM-AEP and PJM-VAP. Each of these interfaces is comprised of multiple buses. Historically, PJM has implemented section 3.3.1(d) by paying all import transactions scheduled from the adjacent control area the LMP (Locational Marginal Price) at the interface assigned to that adjacent control area. The calculation of the LMP for each interface is based on an assumption about the source of the flows from within each adjacent control area. The source of the flows is known as the reference bus and serves as the basis for the detailed modeling of the electrical flows from the adjacent control area to PJM. The detailed modeling reflects the underlying electric reality of the transmission system and therefore the fact that flows from each control area have an identifiable impact on each interface. The LMP at each interface bus is thus based on the expected flows over all interface buses that would result from imports that were scheduled directly to the interface with the adjacent system. For example, flows from the reference bus in the AEP control area on July 19, 2002, had an impact of 60% on the PJM-AEP interface, 20% on the PJM-FE interface, and 12% on the PJM-VAP interface. As a result, when the contract and actual power flow paths are consistent, the LMP paid to transactions at the PJM-AEP interface bus explicitly accounts for the fact that portions of the transaction flow over other buses.

Historically, PJM has paid external transactions assuming that these transactions, scheduled from or through the adjacent control area, were using a direct contract path from that control area to the interface between PJM and that control area. Therefore, PJM paid external transactions based on the scheduled flows to the interfaces. PJM’s interface LMPs did not assume that the transactions were scheduled based on the purchase of

¹ As noted below, interfaces are named after the adjacent control areas. This naming convention does not imply anything about the companies that operate the adjacent control areas.

contract path transmission service that was inconsistent with the actual transaction flow. When PJM observed significant and growing differentials between scheduled and actual flows, PJM issued its pricing notice. The pricing notice provides that import transactions scheduled into PJM at the PJM-VAP interface are paid the price at the PJM-AEP interface when those transactions originate to the west of PJM, regardless of artificial contract paths constructed to avoid the required pricing based on the appropriate flow analysis under section 3.3.1(d). PJM has not had to take this action with respect to import transactions scheduled into the other PJM interfaces, including PJM-FE, PJM-DLCO and PJM-NYIS, because PJM's flow analysis has not indicated any similar gaming behavior at these interfaces attempting to avoid the required flow-based pricing.

Parties entered into transactions with scheduled contract paths different from actual flows in response to the fact that the LMP at the PJM-VAP interface was higher than the LMP at the PJM-AEP interface and in response to the observed fact that PJM historically assumed that contract paths were consistent with actual flows and as a result paid transactions the LMP based on their scheduled contract path. The difference in interface LMPs, when it exists, reflects transmission constraints within PJM and the fact that increased power flows at the PJM-VAP interface are more valuable because they are on the congested side of the constraints.

The difference between contract and actual path power flows from the west (primarily control areas in ECAR and MAIN) created a problem because the power scheduled into the PJM-VAP interface actually flowed at the PJM-AEP interface and made the internal PJM congestion worse rather than better. The more power from the west was scheduled into the PJM-VAP interface, the farther apart the LMPs at the two interfaces were forced by the actual power flows. Despite the fact that the LMP at the PJM-AEP interface indicated that increased power had a low or, at times, a negative value, actual power flows increased at the PJM-AEP interface. This occurred because the transactions were paid the PJM-VAP interface LMP based on their scheduled flows which was, in turn, based on PJM's historic assumption that participants were scheduling on direct paths from adjacent control areas. In addition, the price signal to generation in the western part of PJM was inappropriately reduced as a result of the scheduled transactions at the PJM-VAP interface actually flowing at the PJM-AEP interface. In sum, pricing transactions based on scheduled rather than actual flows at these two interfaces resulted in perverse price signals, which in turn resulted in an unstable economic situation. The price signals incited behavior that made the problem worse rather than better. When the price signals to sellers are aligned with their actual delivered power flows, as LMP requires, rather than scheduled power flows, price arbitrage would tend to drive disparate prices closer together. In this situation, the "arbitrage" drove the prices farther apart because the price signals to the sellers were not aligned with the actual power that they delivered.

The differences between actual and scheduled power flows resulted from the actions of participants that fall into two broad categories, those that had long-term contractual arrangements and those that took shorter term actions to take advantage of the observed

price differential between the PJM-AEP interface and the PJM-VAP interface. For example, some participants purchased or generated energy in ECAR or MAIN and contracted for transmission service through Dominion Virginia Power (notwithstanding the actual flow through the PJM-AEP interface) solely to take advantage of the LMP differential between the PJM-AEP interface and the PJM-VAP interface.

The result of the PJM pricing notice is to decrease the incentive to engage in such a transaction because the participant would be paid the PJM-AEP interface price for the transaction based on the actual power flow.

As another example, a participant purchased energy from the PJM spot market at the PJM-AEP interface and delivered the energy to AEP. The participant purchased energy in AEP, purchased transmission service through Virginia and scheduled delivery to the PJM spot market at the PJM-VAP interface. On paper, the participant purchased power at the PJM-AEP interface, sold it at the PJM-VAP interface and then moved it back to the PJM-AEP interface. The participant was paid the difference in prices between the two interface buses even though absolutely nothing changed in PJM. The identical generation ran in PJM and these transactions resulted in absolutely no change in actual power flows.

The PJM pricing notice also removes the incentive to engage in this type of transaction because the participant would be paid the PJM-AEP interface price for both the purchase and sale, with a zero net result, as is appropriate for a transaction that has no impact on PJM power flows.

The described behaviors are clearly designed to exploit the differences between the way in which PJM LMPs are determined (based on actual power flows) and the artificial contract paths which exist in the areas to the west and south of PJM.

As shown in Table 1, the discrepancy between contract and actual power flows at the PJM-AEP and PJM-VAP interfaces increased beginning in June. For example, the difference between actual and contract power flows at the PJM-AEP interface increased from an on-peak average of 904 MW in April and 1,042 MW in May, to 1,561 MW in June and 1,821 MW in the first 19 days of July. Correspondingly, the difference in price between the PJM-VAP and PJM-AEP interfaces increased from an on-peak average of \$7.19 per MWh in April and \$6.49 in May, to \$14.33 in June and \$16.44 in the first 19 days of July.

Table 1. Average Interface LMP Differentials and Actual-Schedule Differentials					
	Apr-02	May-02	Jun-02	July 1-19	July 20-31
On-Peak Hours					
\$VAP - \$AEP (\$/MWh)	\$7.19	\$6.49	\$14.33	\$16.44	\$9.88
VAP Act - Sch (MW)	-533	-748	-1,323	-1,577	-891
AEP Act - Sch (MW)	904	1,042	1,561	1,821	780
Off-Peak Hours					
\$VAP - \$AEP (\$/MWh)	\$5.13	\$0.01	\$4.87	\$7.41	\$4.38
VAP Act - Sch (MW)	-582	-460	-346	-457	-229
AEP Act - Sch (MW)	740	459	457	633	251

Figure 1 shows the actual versus scheduled power flows for the two interfaces from April through July, in more detail. Figure 1 illustrates the increase in the frequency of power flow differentials above 2,000 MW starting in mid June and the consistently higher power flow differentials beginning in late June. Figure 1 also shows the associated interface LMP differentials in more detail. Figure 1 illustrates the increased density of interface LMP differentials above \$30 beginning in mid June and the greater differentials beginning in late June.

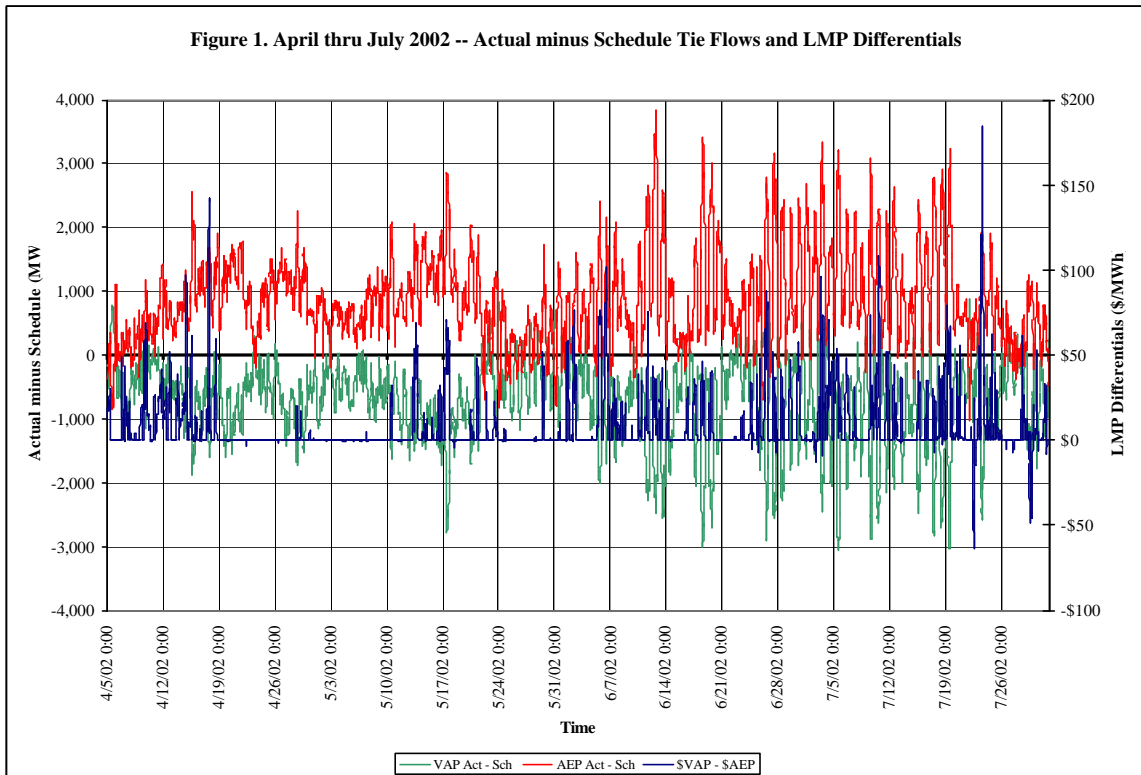


Figure 2 shows the actual versus scheduled power flows and the LMP differential for the two interfaces in July. While there were several days in July with maximum power flow differences of 3,000 MW, July 17, 18 and 19 showed maximum differences of 2,714, 2,909 and 3,243 MW. The corresponding maximum LMP differentials were \$30.26, \$45.82 and \$79.38. On July 19, there was a steadily increasing power flow differential and fluctuating LMP differentials between the two interface buses through the hour ended 1400, when PJM posted its modified interface pricing notice.

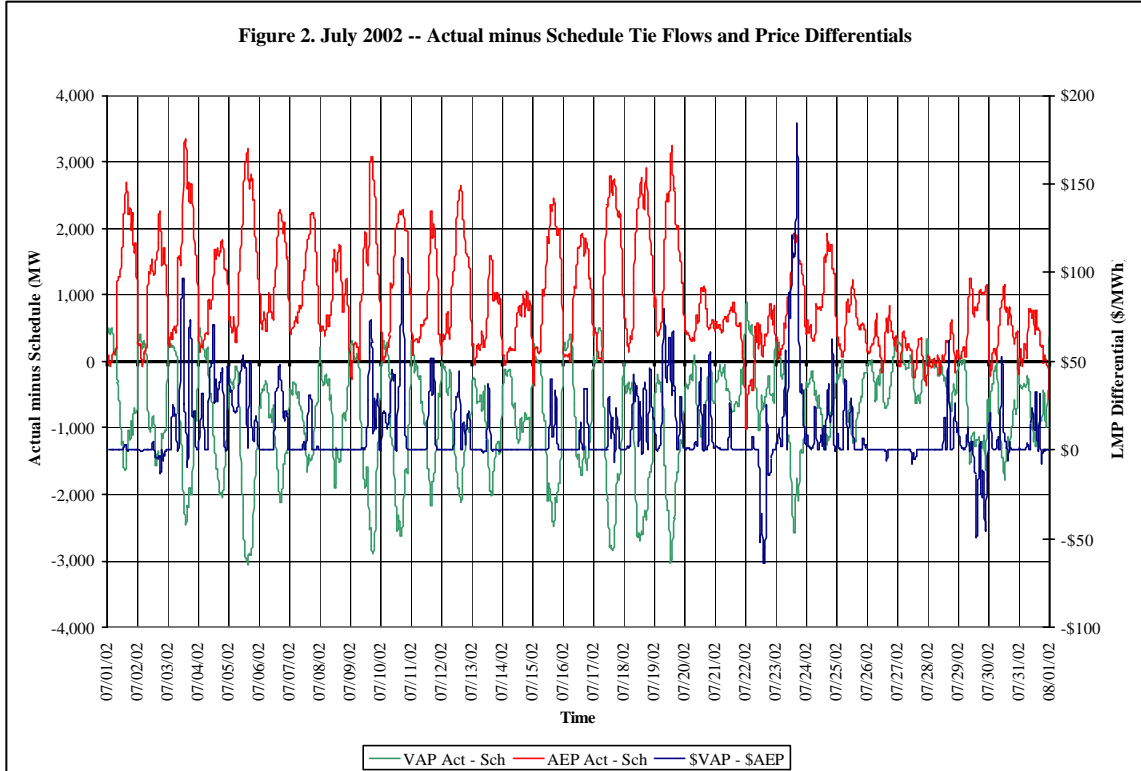


Table 1 shows the impact of PJM’s interface pricing notice. While the average on-peak power flow versus scheduled path differential at the PJM-AEP interface was 1,821 MW from July 1 through July 19, the average for the balance of the month was 780 MW. The average on-peak LMP differential between the two interfaces was \$16.44 from July 1 through July 19, while the average for the balance of the month was \$9.88. Figures 1 and 2 illustrate the impact of PJM’s interface pricing notice in more detail. There is a clear break in the level of the actual versus scheduled power flows after July 19.

As Figures 1 and 2 show, significant differentials between actual and scheduled power flows did not appear for the first time on July 19. In fact, such differentials reached the 3,000 MW level three times in June and three times in July prior to July 19. In retrospect, the developing pattern of actual versus scheduled power flow differentials and LMP

differentials between the interfaces in June and in July could have formed the basis for earlier action by PJM to correct the interface pricing. While PJM had not been contemplating action on this issue prior to July 19, it was the pattern of increasing power flow differentials and LMP differentials culminating on July 19 that led PJM to take action on that day. While it can be reasonably argued that PJM could have seen this issue earlier, that was not a reason to further postpone action as the situation deteriorated on July 19.

The observed differences in actual and scheduled flows at the two interfaces were the result of actions designed to exploit the differences between the way in which PJM LMPs are determined and the artificial contract paths which exist in the areas to the west and south of PJM. Absent the pricing notice that PJM issued, contracts with similar, or even identical, flow patterns (e.g. sourced at the same ECAR generation) would receive different prices if they were scheduled based on different contract paths. Contracts scheduled consistent with actual flows, on the most direct path to PJM (into the PJM-AEP interface), would receive a substantially lower price than contracts artificially scheduled inconsistent with actual flows (into the PJM-VAP interface).

Once PJM had identified the seriousness of the situation, it made sense to act to end the identified practice. PJM was under no obligation to facilitate continued gaming of market rules which in turn resulted in significant economic distortions within PJM and in transactions between PJM and external control areas. PJM therefore corrected the interface pricing prospectively, ensuring that transactions are paid based on flows, not artificial contract paths around PJM, as LMP requires. The result of aligning interface prices with actual power flows was to create market forces that acted to substantially reduce the identified problem.

PJM Emergency Procedure Messages

Emergency Energy Bid Form

Historical Emergency Procedure Messages - Emergency Procedure Message Definitions

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Cancel --Maximum Emergency Generation

As of 1415 hours, the Maximum Emergency Generation Action for Eastern PJM has been cancelled.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

AT 1756 PJM CANCELLED THE HEAVY LOAD VOLTAGE SCHEDULE AND WARNING.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

Today PJM issued an Emergency Message stating that: “Effective today, at 1500 EDT, all transactions that source or sink in the ECAR or MAIN region, as determined by NERC Tag, will be assigned the PJM-AEP interface price regardless of contract path. If you have any questions, please contact Joe Bowring, PJM Market Monitor, at 610-666-4536.” To further clarify, this policy will not be applied to contracts scheduled through the PJM-FE interface. Such contracts will continue to receive the PJM-FE interface price.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

This policy will remain in effect until further notice. PJM will continue to monitor the situation. PJM took this action as a result of the large and growing discrepancy between contract and actual power flows at the PJM-AEP interface and the PJM-VAP interface. PJM was subjected to loop flows in excess of 3,000 MW, which caused significant economic distortions and potential reliability issues that needed to be addressed immediately. PJM’s actions resulted in prices that were more consistent with actual power flows, allowing market forces to correct the problem.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

PJM took this action in accordance with 3.3.1(d) of Schedule 1 of the Operating Agreement, which states in part: “For pool External Resources the Office of the Interconnection shall model, based on an appropriate flow analysis, the hourly amounts delivered from each such resource to the corresponding interface point between adjacent Control Areas and the area comprised of the PJM West Region and PJM Control Area.” PJM will provide a more detailed analysis of this situation to the PJM Energy Market Committee next week.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

Effective today, at 1500 EDT, all transactions that source or sink in the ECAR or MAIN region, as determined by NERC Tag, will get assigned the AEP interface price regardless of contract path. If you have any questions, please contact Joe Bowring, PJM Market Monitoring at 610-666-4536.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Maximum Emergency Generation

As of (1305) hours, a Maximum Emergency Generation Action has been issued in Eastern PJM. Any off system energy sales from PJM capacity resources may be recalled as necessary.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

At 0943 a Heavy Load Voltage Schedule was issued.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

At 0818 PJM Issued TLR 0 for Wylie Ridge #7 transformer, Flow Gate 2357.

07/19/2002 PJM EMERGENCY PROCEDURE MESSAGE -- Special Notice

0612 hours PJM issued TLR level 1 for Wylie Ridge flowgate 2357



VIA E-MAIL TRANSMISSION

August 1, 2002

MEMBERS COMMITTEE; ENERGY MARKET COMMITTEE

Dear Committee Members:

This letter provides a restatement and a clarification of the interim rules for pricing external transactions that are scheduled for delivery at or delivery from the PJM-VAP interface. These rules were introduced on Friday, July 19, 2002 and announced via the eData system and the OASIS. These rules will be in effect until further notice.

Interim Rules For External Transaction Pricing

1. If a transaction path, based on the NERC tag, for a transaction into PJM at the PJM-VAP interface, includes an ECAR or MAIN control area, then the transaction will be priced at the PJM-AEP interface price. For example, a transaction from a control area within MAPP through an ECAR control area to the PJM-VAP interface will receive the PJM-AEP interface price, regardless of the scheduled delivery point.
2. If a transaction path, for a transaction out of PJM from the PJM-VAP interface, includes an ECAR or MAIN control area, then the transaction will be priced at the PJM-AEP interface price. For example, a transaction from PJM-VAP interface to a control area within MAPP through an ECAR control area will receive the PJM-AEP interface price, regardless of the scheduled source.
3. If a transaction or an increment offer is scheduled at the PJM-VAP interface in the day ahead market and a transaction, which is sourced in ECAR or MAIN, as defined in point 1 above, is scheduled in real time for delivery at the PJM-VAP interface, the real time transaction will be treated as delivered to the PJM-AEP interface and there will be a deviation from the day ahead position.
4. PJM will develop a method for pricing external transactions at the interface buses based on an analysis of implicit LMPs in external control areas. This method, when completed, will replace the method defined in points 1 through 3 above.

Please contact me if you have any questions. I can be reached at 610-666-4563 or via e-mail at bowrij@pjm.com.

Sincerely,

Joseph E. Bowring
Manager

Service With Integrity